COLLEGE READINESS: DIFFERENCES BETWEEN STUDENTS WITH AND WITHOUT ADHD

A Thesis by
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Submitted to the Graduate School
at Appalachian State University
in partial fulfillment of the requirements for the degree of
MASTER OF ARTS

May 2017
Department of Psychology

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Abstract

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Attention-deficit/hyperactivity disorder (ADHD) is characterized by inattentive, hyperactive, and impulsive behaviors. Impairment for individuals diagnosed with ADHD tends to begin at a young age, affecting many domains in life. One such domain is achieving a college education. College students with ADHD tend to have lower GPAs, take longer to graduate, and have higher dropout rates than individuals not diagnosed with ADHD. Individuals with ADHD may be inadequately prepared for college. College readiness is proposed to comprise of self-determination, academic, and daily living skills, all of which are possible areas of deficit for individuals with ADHD. The current study examined differences in college readiness in undergraduates with and without ADHD. In general, students with ADHD were found to be less prepared for college than those without ADHD; specific areas of unpreparedness were explored. This finding supports the need for early intervention for students with ADHD. Further research is needed on possible interventions to help individuals with ADHD be successful in all domains.

Keywords: ADHD, college, readiness, academic, daily living skills, self-determination

Acknowledgements

I would like to thank Drs. Will Canu, Joshua Broman-Fulks, and Kurt Michael for their support and contribution to this research project and my graduate career. I am especially grateful to Dr. Canu for his persistent assistance and guidance during every step of the project. I would also like to thank Drs. Canu, Cynthia Hartung, and Elizabeth Lefler and their teams for allowing me access to data they collected. Additionally, I would like to thank the Psychology Department, and especially the Clinical Psychology Program, at Appalachian State University for providing me with the opportunity to complete this project and also earn a master's level education, and in doing so, allowing me to grow both professionally and personally.

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College Readiness: Differences between Students with and without ADHD

Attention-deficit/hyperactivity disorder (ADHD) is characterized by developmentally inappropriate inattentive, hyperactive, and impulsive behaviors (American Psychiatric Association, APA, 2013). ADHD was once believed to exclusively exist in children, but is now understood to persist into adulthood in the majority of individuals (Barkley, Murphy, & Fischer, 2008). Adults with ADHD report difficulty in workplace and occupational functioning, social functioning, dating or marital relations, community activities, and educational settings (Barkley et al., 2008). One of these educational settings is college, where individuals with ADHD tend to have lower GPAs, take longer to graduate, and have higher dropout rates than individuals without ADHD (Murray, Goldstein, Nourse, Edgar, 2000). Given these sorts of outcomes, it seems reasonable to question whether high school students with ADHD are being adequately prepared for the transition to and expectations of college life, yet few researchers have directly examined this topic. The current study will address this shortcoming in the literature by specifically comparing readiness for college in first-year undergraduates with and without ADHD.

College Readiness. There has been continuing concern in recent years about how ready high school graduates are for college, in general, and especially for students not in the top academic quartile in their school (Conley, 2005; Kirst, 2008; Leonard, 2013). College readiness corresponds to a level of academic and personal preparation an individual requires to enroll and succeed in a postsecondary institution, with success defined as completing course work with understanding and proficiency and without remediation (Conley, 2007).

Conley (2008) further defines college readiness by articulating four categories of preparation: (a) cognitive strategies, such as problem solving; (b) content knowledge, such as writing skills; (c) academic behaviors, such as time management; and (d) contextual

skills, such as adjusting to a campus environment. Cognitive (and behavioral) abilities that characterize these aspects of college preparation and allow the student to learn a variety of disciplines and to succeed are: (a) problem formulation and problem solving; (b) research; (c) reasoning, argumentation, proof; (d) interpretation; and (e) precision and accuracy. The next layer of preparation is content knowledge in core academic subjects (i.e., English, Math, Science, and Social Studies). In addition, other cognitive behaviors such as self-awareness, self-monitoring, and self-control are crucial for gaining and maintaining success. Finally, contextual skills and knowledge, or the understanding of the norms of a university culture, are also important. Such understanding and skill involves knowing how to interact with professors appropriately, being comfortable around individuals from different backgrounds, and taking advantage of academic and personal support services. If a student is college-ready based on this conceptualization, they will understand what is expected in college courses, cope with the content that is presented, and as a result develop key intellectual gains (Conley, 2008).

Relatedly, Donham (2014) found in a review of the literature that college readiness requires students to engage in their learning experiences involving seeking, evaluating, and integrating information, and additionally developing reading and writing skills that contribute to the construction of ideas and insights. Past research also supports that college readiness not only involves academic skills and knowledge, but also student choice, disposition, and adequate social networks (Leonard, 2013).

Maitland and Quinn (2011) incorporate the previous definitions of college readiness by utilizing a scale-subscale approach. They define college readiness via three categories: (a) self-determination, (b) academic, and (c) daily living. Each of the categories can be further broken down into subscales. Self-determination subscales include self-knowledge,

self-advocacy/communication, and self-management. Self-care, organization, and time management are subsumed in daily living skills. Self-knowledge, study skills, and time management make up academic skills. Maitland and Quinn's (2011) conceptualization is both parsimonious and relatively comprehensive, and therefore will be utilized herein.

All students require a good degree of college readiness to succeed in higher education, yet individuals with disorders are at higher risk for poor adaption to college and thus may need particularly robust college readiness to buffer against negative outcomes. For instance, 20-21% of individuals with ADHD go to college, compared to 68-78% of their non-diagnosed peers. In addition, of the individuals with ADHD that go to college, only 9.1% graduate, compared to 60.6% of their non-diagnosed peers (Barkley et al., 2008). Prior research has suggested that the hyperactivity, inattention, and impulsivity that define ADHD may put affected individuals at an even greater risk for failure in college, therefore suggesting poor overall readiness.

ADHD and College Readiness: Theoretical Rationale for a Negative Association

Impairment in individuals with ADHD is documented in children and adults across various domains. Domains of adjustment that pertain closely to college readiness and successful adaptation in higher education include (a) self-determination, (b) academic, and (c) daily living skills (Maitland & Quinn, 2011). Generally, the evidence is such that it is expected that individuals with ADHD will have deficits in these areas; information supporting this broad hypothesis will be reviewed below.

Self-determination skills. A self-determined individual knows who they are and what their strengths and weaknesses are. They are able to set their own goals and make plans to achieve their goals, which may include finding the appropriate resources to do so.

They can also solve problems, regulate their behavior, and effectively make decisions (Maitland & Quinn, 2011).

Unfortunately, individuals with ADHD tend to have deficits in executive functioning (Barkley et al., 2008) that could impede satisfactory self-determination. Executive functioning is a cognitive process that requires several sub-processes such as (a) planning, (b) problem solving, (c) response inhibition, (d) working memory (Seidman, 2006), and (e) self-evaluation (Barkley, 1997), all integral to self-determination. Individuals with ADHD have been found to have particular deficits in response inhibition and working memory, both in childhood (Frazier, Demareem, & Youngstrom, 2004; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005) and in adulthood (Boonstra, Oosterlaan, Sergeant, & Buitelaar, 2005; Hervey, Epstein, & Curry, 2004). Deficits in the executive functioning and self-evaluation in children have been well explored and documented, although less is known about adulthood (Knouse, Bagwell, Barkley, & Murphy, 2005). Many studies demonstrate that children diagnosed with ADHD appear to have a positive illusory bias, or inflated self-estimates of competence in several domains (Owens & Hoza, 2003), affecting their ability to demonstrate self-determination. Adults diagnosed with ADHD tend to demonstrate a lack of insight into their symptomatic presentation, too, as demonstrated by underreporting in comparison to secondary informants (Knouse et al., 2005; Sibley et al., 2012; Zucker et al., 2002). In one study, adults with ADHD were asked to recognize facial emotions, and although they performed poorly compared to a control group they reported feeling just as confident in their accuracy (Rapport, Friedman, Tzelepis, & Van Voorhis, 2002). The discrepancy between performance and perception thereof could limit their ability to engage in introspection associated with self-determination. In short, these documented differences

will likely contribute to individuals with ADHD having deficient self-determination, or knowledge regarding who they are and their strengths and weaknesses.

Goal-setting, which also contributes to self-determination, involves the ability to initiate new concepts, plan actions in advance, and approach tasks in a strategic, efficient manner (Anderson, 2002). Working memory is a primary cognitive function involved in goal-directed behavior (Nyman et al., 2010), needed to store and process information when completing tasks (Baddeley, 2003), and has consistently been found to be a central deficit in the executive functioning of individuals with ADHD (e.g., Holmes et al., 2010). In addition, individuals with ADHD have deficits in behavioral inhibition and self-regulation (Burns & Martin, 2014), which are necessary for reaching goals. Behavioral inhibition is the capability to stop a response in order to create a delay that self-directed action can take place during (Barkley, 2006). Individuals with ADHD have deficits in these areas and therefore struggle to regulate their behavior (Barkley, 2006). When attempting to reach a goal, a change in one's own behavior is necessary, which requires inhibiting certain behaviors and regulating oneself. Since individuals with ADHD struggle with behavioral inhibition and self-regulation it is likely that they will also struggle with goal-directed behavior, which may also derail self-determination.

Daily Living Skills. Daily living skills consist of tasks such as doing laundry, waking up on time, exercising, preparing meals, and keeping track of important items (Maitland & Quinn, 2011). In order to complete these tasks appropriately, planning and organization must occur, which involves executive functioning. Barkley and Murphy (2011) found that individuals diagnosed with ADHD have executive function deficits in five domains, as compared to community or other clinical groups, including (a) self-management to time, (b) self-organization and problem-solving, (c) self-discipline, (d) self-motivation,

and (e) self-activation/concentration. Each of these domains contributes to managing one's time to complete daily living tasks, being motivated to do them, and having the focus and knowledge to complete them. Barkley and Murphy's (2011) conclusions are consistent with past findings regarding executive functioning problems of individuals with ADHD that involve self-regulation toward the future (Barkley, 1997), sustained problem solving to achieve goals (Welsh & Pennington, 1988), and the cross-temporal organization of behavior (Fuster, 1997). Difficulties with organization, planning ahead, and failure to notice and learn from mistakes will likely exacerbate challenges with activities like laundry, grocery shopping, and making appointments (Maitland & Quinn, 2011). In sum, associated cognitive deficits will likely put those with ADHD at a greater risk for problems in daily living skills.

Academic Skills. Academic skills are a certain set of knowledge about how to be successful in college including being aware of the best learning environment for oneself, how to take notes, and how to set up a study schedule (Maitland & Quinn, 2011). For all first-year students the difficulty of course work at a university can be challenging; however, it is often especially challenging for individuals with ADHD. The students with ADHD that are accepted to college have previously found ways to compensate for their deficits, but often those strategies are no longer successful for college level coursework (Maitland & Quinn, 2011).

Academic related impairments in functioning for children with ADHD have been well documented (see review in Evans, Langberg, Egan, & Molitor, 2014), and it is clear that early ADHD symptoms are related to academic performance later in life, as well. For instance, adolescents diagnosed with ADHD, in comparison to typically developing peers, (a) are three to five times more likely to fail a course, (b) four to five times more likely to

have lower class placement, (c) twice as likely to be absent or late to school, and (d) eight times more likely to drop out of high school (Kent et al., 2011; Molina et al., 2009; Langberg et al., 2011). The previously discussed deficits in self-knowledge and time management may also play a role in poor academic functioning for individuals with ADHD. If a student has not fully developed academic knowledge and skills before arriving at a university, their struggles will only increase with the more rigorous coursework, equating to poor readiness for college.

ADHD and College Readiness: Circumstantial Evidence for a Negative Association

There are many challenges that all young people face in the transition from high school to independent living in emerging adulthood, including the abrupt loss of parental support, having a still-immature neurological system (Casey, Getz, & Galvav, 2008), and increased demands for self-management. Given the characteristic impairments that occur in emerging adults with ADHD, the adjustment to college can be particularly difficult. It is known that such individuals are at high risk for maladjustment in many areas of life including academic, social, and psychological domains. Research suggests that such impairments commonly include relational difficulties (Canu & Carlson, 2003; Canu, Tabor, Michael, Bazzini, & Elmore, 2013), internalizing symptoms and poor stress management (Eddy, Canu, Broman-Fulks, & Michael, 2014; Rabiner, Anastopoulos, Costello, Hoyle, & Swartzwelder, 2008; Weyandt & DuPaul, 2008), and lower quality of life (Combs, Canu, Broman-Fulks, & Neiman, 2014; DuPaul, Weyandt, O'Dell, & Vareho, 2009; Fleming & McMahon, 2012).

A minority (~25%) of individuals with ADHD are able to overcome such obstacles and attend college. In fact, it is likely that 2-8% of students in college have an ADHD diagnosis (DuPaul et al., 2009). Still, even these individuals tend to have higher rates of

academic probation and dropout, lower GPAs, and poorer overall functioning than peers without ADHD (Blase et al., 2009). In many ways, the body of findings suggests that the average college student who has ADHD may, in addition to syndrome-related deficits, have an overall inadequate set of skills and behavioral patterns to facilitate success. However, there is relatively little research that specifically examines *why* students with ADHD do less well, and whether a lack of readiness for college accounts for some of these negative outcomes, as opposed to other factors (e.g., presence of ADHD symptoms, themselves).

Factors that Might Moderate Low College Readiness

Both life experiences and interventions might influence the preparedness of students with ADHD for college. For instance, it is often the case that parents and teachers do more to structure the activities and tasks of children and adolescents with ADHD than for non-affected peers. While this can facilitate positive short-term (i.e., pre-college) adjustment in school, it also inadvertently takes away the learning opportunity of developing and properly implementing executive functioning skills away from the individual (Maitland & Quinn, 2011).

With regards to pre-college treatment experience, stimulant medication is very commonly used to treat ADHD (Donnelly, Haby, Carter, Andrews & Vos, 2004), and studies have found that, when used appropriately, it is efficacious for decreasing impulsivity and hyperactivity and increasing attention (Adler, Spencer, McGough, Jiang, & Muniz, 2009; Advokat, 2010; DuPaul et al., 2012; Weyandt & DuPaul, 2006). Psychosocial interventions utilizing behavioral and cognitive techniques have also been found to be effective in treating children with ADHD (Hechtman et al., 2004; Hoath & Sanders, 2002). They can include (a) behavior modification, (b) neurofeedback, (c) school-based programs, (d) parent training, (e) working memory training, and (f) self-monitoring (Purdie, Hattie, &

Carroll, 2002). For maximal symptom reduction, a combination of stimulant medication and nonpharmacological interventions is often recommended (Purdie et al., 2002). In contrast, findings regarding the effects of these varied interventions on impairment, not solely symptom presence, are mixed. Medication treatment appears to have little impact on impairment across most domains, but has the greatest reduction in academic impairment (Sibley, Kuriyan, Evans, Waxmonsky, & Smith, 2014). Due to some reduction in impairment, it is likely that students that have been exposed to medication or behavioral treatments will be more college ready. Additionally, receiving treatment likely means that they are aware of their ADHD symptoms. Being more aware of their symptoms, likely allowed them to better manage their symptoms; and, therefore, become more college ready.

Other interventions aimed at assisting adolescents with ADHD and that could possibly affect college readiness skills include ADHD-specific camps and after school programs. One program is The Challenging Horizons Program, an after-school program that targets academic skills, social skills, and independence. This program has yielded considerable evidence for improved adjustment in the targeted domains (Evans, Schultz, DeMars, & Davis, 2011). Similarly, the Summer Treatment Program for Adolescents is an 8-week day camp program that employs reward and response cost programs to target disruptive behavior, classroom performance, and social functioning (e.g., Fabiano, Schatz, & Pelham, 2014). Sibley et al. (2011) found adolescents who participated in the program demonstrated functional improvement in the home, classroom, and non-academic contexts. Finally, cognitive-behavioral therapy (CBT) has been found to be successful for treating adults with ADHD (Safren et al., 2005; Solanto et al., 2010; Weiss et al., 2008), as well, and many studies suggest utility for CBT improving symptoms in emerging adults with ADHD (Anastopoulos & King, 2014; Eddy et al., 2014; Fleming, McMahon, Moran, Peterson, &

Dreessen, 2015; Wymbs & Molina, 2014). Some reviews suggest that it is less often used and less successful with children and adolescents (Roman, 2010), while others suggest that it is effective (Young & Amarasinghe, 2010). Overall, it is clear that more research on interventions for ADHD throughout the lifespan is needed, and perhaps especially so for those emerging adults in college to ascertain whether intervention bolsters readiness for or general adaptation in that setting.

Current Study

The current study examines the differences in college preparation for first-year students with ADHD compared to their typically developing peers, as measured primarily by the *College Readiness Scale* (CRS; see Appendix A; Maitland & Quinn, 2011). The CRS examines many behaviors that pertain to the construct of readiness for college, including self-determination, daily living skills, and academics. It is hypothesized that due to their characteristic traits and impairments, noted above, first-year university students with ADHD will report lower readiness for (a) self-determination (i.e., communication skills), (b) daily living skills, and (c) academic skills, as compared to their non-diagnosed peers. It is also hypothesized that these differences will be detectable even when considering whether the former have received prior psychotherapy for ADHD.

Method

Participants

Participants in the current study were a subsample taking part in a broader study (Canu, Ranson, Hartung, Lefler, & Stevens, 2014) focusing on developing developmentally sensitive assessment criteria for ADHD in college students. Participants were recruited from three universities: Appalachian State University (ASU), the University of Wyoming (UW), and the University of Northern Iowa (UNI). There were 2,197 total participants, 631 (28.7%

of overall sample; 88.7% European-American, 69.1% females, 30.7% males) of whom indicated that they were in the first year of college and were included in the current study focusing on readiness in students most proximal to their high-school-to-college transition. The ethnic representation of the sample is clearly disparate from the general population of the United States, yet it should be noted that it is typical of the universities that participated in the study.

Overall, the included sample was made up of 340 participants from ASU (69.7% females, 30.0% males), 259 from UW (68.7% females, 31.3% males), and 32 from UNI (65.6% females, 34.4% males). An ADHD group of 88 participants (4% of total sample; 62.5% female with 1 participant declining to report biological sex) was identified via self-reported diagnosis and/or symptoms and impairment consistent with clinically significant ADHD (i.e., above DSM-5 standards; see Fedele, Hartung, Canu, & Wilkowski, 2010, for fuller description of method), as was a non-diagnosed control group including 543 participants (70.2% female, 29.6% male, 1 declining to report biological sex). Of those in the former group, 13 participants met current ADHD diagnostic symptom criteria for hyperactivity/impulsivity and/or inattention *and* had a previous diagnosis, 52 indicated a previous diagnosis and had sub-threshold current symptoms, and 23 reported current symptoms meeting or exceeding the diagnostic threshold but no previous diagnosis. Of the participants that reported being previously diagnosed with ADHD, 50 participants reported the diagnosis being made by a medical doctor, 10 by a doctoral level psychotherapist, and 1 by a master's level psychotherapist. Participants with comorbid diagnoses were included.

Within the ADHD group, participants reported comorbidities including specific learning disorder in reading (n = 4), specific learning disorder in math (n = 3), and mood or anxiety disorders (n = 32). Several within the non-ADHD group reported a psychiatric

diagnosis, too; these included specific learning disorder in reading (*n* = 9) and math (*n* = 3), and mood and anxiety disorders were represented in this group as well (*n* = 63). Within the ADHD group, many participants reported having received mediation at some point in their lifetime for a mental health problem (*n* = 62, 72.9%). Of those students many reported currently taking a stimulant medication for ADHD (*n* = 33, 38.8%), and a few also reported currently taking an anti-depressant medication (*n* = 3, 3.5%). Within the ADHD group, many participants also reported participating in psychosocial treatment at some point in their lifetime (*n* = 27, 31.8%), and of those participants a few reported currently participating in individual cognitive behavioral therapy (*n* = 8, 9.4%). Several within the non-ADHD group reported having received medication at some lifetime point for a mental health problem (*n* = 66, 12.1%). Of those students, some reported currently taking a stimulant medication for ADHD (*n* = 4, 0.7%), and a few also reported currently taking an anti-depressant medication (*n* = 22, 4.0%) or an anti-anxiety medication (*n* = 4, 0.7%). Within the non-ADHD group, many participants also reported participating in psychosocial treatment at some lifetime point (*n* = 61, 11.2%), and of those participants a few reported currently participating in individual cognitive behavioral therapy (*n* = 3, 0.5%) or group cognitive behavioral therapy (*n* = 1, 0.2%).

The ADHD group was composed of different predominant presentation types, as follows: inattentive (*n* = 16), hyperactive/impulsive and combined (*n* = 66, 15% hyperactive/impulsive, 85% combined), or not otherwise specified (*n* = 2; NOS). This categorization was based on self-report and/or self-reported symptoms on the Current Symptoms Scale (Barkley & Murphy, 2006) and Childhood Symptoms Scale (Barkley & Murphy, 2006). The NOS group consists of participants that reported an ADHD diagnosis made by a psychologist or general practitioner and engaged in some type of treatment (e.g.,

medication and/or psychosocial), but self-reported sub-threshold symptoms on both the Current Symptoms Scale (Barkley & Murphy, 2006) and Childhood Symptoms Scale (Barkley & Murphy, 2006).

Measures

Demographics form. This self-report form includes participant's sex, date of birth, ethnicity, hometown, years of education completed, high school grade point average (GPA, reported on a 8-point scale corresponding to half-point increments from 0.0 to 4.0), college GPA, college entrance exam score, mental health treatment history, and date of initial ADHD diagnosis and type of diagnostician (see Appendix B).

Current Symptoms Scale- Self Report. This self-report form (CSS; see Appendix C; Barkley & Murphy, 2006) contains 18 ADHD and 8 Oppositional Defiant Disorder (ODD) items. The wording of items is very close to that of the *DSM-5* (APA, 2013) ADHD criteria; participants are asked to rate the frequency of the behaviors within the last 6 months. Responses are on a 4-point Likert scale (0 = n*ever/rarely*, 1 = *sometimes*, 2 = o*ften*, or 3 = *very often*), with a score of 2 or 3 converting into positive symptom presence for the purposes of evaluating diagnostic status (APA, 2013). Psychometric properties are satisfactory, with a Cronbach's alpha of .86 and .84 for inattention and hyperactivity-impulsivity, respectively (Fedele, Lefler, Hartung, & Canu, 2012). Additionally, the measure had good internal reliability in the current study (α = .91).

Childhood Symptoms Scale- Self Report. This form (ChSS*;* see Appendix D; Barkley & Murphy, 2006) asks participants to report on externalizing behaviors in childhood (5-12 years of age) and includes 18 ADHD, 8 ODD, and 15 Conduct Disorder (CD) items. The scaling of items is as per the CSS except that dichotomous positive or negative symptom presence is noted for each CD item. The internal consistency is excellent

with a Cronbach's alpha of .95 for inattention, .93 for hyperactivity/impulsivity, and .96 total (Barkley, 2013). The measure was found to have superior internal reliability herein, as well (α = .96).

Weiss Functional Impairment Rating Scale. This measure (WFIRS; see Appendix E; Weiss et al., 2007) captures impairment across several life domains that are relevant to adults, and has seven subscales (a) family (8 items; e.g., causing fights in the family), (b) work (11 items; e.g., problems with getting work done efficiently), (c) school (11 items; e.g., problems completing assignments), (d) life skills (12 items; e.g., problems keeping up with household chores), (e) self-concept (5 items; e.g., feeling frustrated with yourself), (f) social (9 items; e.g., problems making friends), and (g) risk (14 items; e.g., aggressive driving). Participants are asked to evaluate presence of specific behavioral indicators of impairment in these domains using a four-point Likert scale (0 = *never/not at all*, 1 = *sometimes or somewhat*, 2 = o*ften or much*, and 3 = *very often or very much*). A domain is considered to have impairment if two items = 2 or if one item = 3. Psychometric properties are considered good, with internal consistency coefficients of about .80 for the measure and for each domain (Weiss et al., 2007). Canu, Hartung, Stevens, and Lefler (2016) found the WFIRS demonstrated concurrent validity and strong internal reliability. Additionally, the measure had good internal reliability in the current study (α = .96).

College Readiness Scale. This self-report (CRS; Maitland & Quinn, 2011) has 43 total items that address different aspects of an undergraduate's readiness for college. There are three subscales: self-determination (15 items), daily living skills (13 items), and academic skills (15 items). Each subscale then has three subsections within it. Self-determination contains: self-knowledge (e.g., *I know a lot about myself and am aware of my feelings and reactions when I have to get used to new people, places, and situations and*

what helps me adjust), self-advocacy/communication skills (e.g., *I can easily introduce myself to new people and hold conversations with others*), and self-management (e.g., *I can develop a plan to reach my goals and can put it into action*). Daily living skills contains self-care (e.g., *I can take any medication I need with few or no reminders*), organization (e.g., *I can keep track of my important possessions and find them when I need them*), and time management (e.g., *I can awaken myself each day and get out the door without much help from my parents*). Academic skills contains self-knowledge (e.g., *I know when and where I need to study to get the best results*), study skills (e.g., *I know how to take notes from my reading assignments*), and time management (e.g., *I can set up my own study schedule*). Participants are asked to evaluate how applicable the items are to them using a four-point Likert scale (0 = *never/not at all,* 1 = *sometimes or somewhat,* 2 = o*ften or true,* and 3 = *very often or very true)*; see Appendix F for more item-level detail). Reponses of 0, 1 or 2 indicate areas that merit improvement and, therefore, suboptimal college readiness. The measure showed satisfactory internal reliability herein (α = .97, total scale) and elsewhere (α > .8 on all scales/subscales; Canu, Ranson, Hartung, Lefler, & Stevens, 2014), indicating strong internal consistency.

Procedure

Students at ASU, UW, and UNI were recruited through the Psychology research subject pools at each institution, and an over-sampling of prior ADHD diagnosed participants was achieved via recruitment through offices that serve individuals with mental health disorders (e.g., student disability services, mental health clinics). After completing informed consent (Appendix G), participants were directed to complete an online survey that contained the measures noted above as part of a larger battery. Completion of the online survey typically took 45-60 min. Questionnaires were presented in a standardized order.

Participants received either course credit or a payment of $20.00 for completion. The study was approved by all participating universities' Institutional Review Boards (see Appendix H for the current institution's approval).

Results

Analyses of Demographic and ADHD Diagnosis Differences

Chi square tests demonstrated no differences between the ADHD and non-ADHD groups on gender, χ^2 (1, N = 630) = 2.17, p = .14 (62.4% and 70.3% female, respectively) or ethnicity, χ^2 (1, N = 630) = .29, p = .59 (88.6% and 90.6% European American, respectively). An independent samples-*t* test similarly revealed no differences between the ADHD and non-ADHD groups on age, t (629) = .19, p = .85, M = 18.35 (SD = .53) and M = 18.37 (SD = .63), respectively. As such, groups were considered to be demographically equivalent and such variables were not controlled for in subsequent analyses.

Independent sample-*t* tests were used to examine whether those identified in the ADHD group differed on independent variables (i.e., readiness) based on identification via (a) prior diagnosis or (b) meeting current symptom and impairment criteria for diagnosis. No significant differences were found for Self-Determination scale scores, t (61) = .13 p = .89, subgroup A (M = 1.63, SD = .46) and subgroup B (M = 1.61, SD = .57); Daily Living scale scores, t (62) = 1.23 p = .22, M = 1.69 (SD = .58) and M = 1.49 (SD = .63), respectively; or Academic scale scores, t (61) = .43 p = .67, M = 1.52 (SD = .57) and M = 1.49 (SD = .53), respectively. Accordingly, both of these subgroups were considered equally impaired (i.e., in terms of college readiness), and merged for analytic purposes into a single ADHD group.

In examining for potential differences between those with the predominantly inattentive or combined presentations of ADHD, significant differences were found on the

Self-Determination scale scores, t (58) = -2.39 $p < .05$ (inattentive presentation [IA] M = 1.29, SD = .56, hyperactive/impulsive or combined [C] presentations M = 1.69, SD = .46), and the Academic scale scores, t (58) = -2.11 $p < .05$ (IA M = 1.19, SD = .44, C M = 1.57, SD = .57). However, no significant differences were found on the Daily Living scale scores, t (59) = -.88, p = .38, and overall CRS scores, t (57) = -1.73, p = .09 (IA M = 1.48, SD = .64 and M = 1.37, SD = .47, respectively; C M = 1.64, SD = .57 and M = 1.63, SD = .45, respectively). Given these differences, predominant ADHD type presentation was controlled statistically in analyses concerning the indicated college readiness scales.

Analyses of Overall CRS Scores

An analysis of covariance (ANCOVA) test, with lifetime and current medication use, lifetime and current psychosocial treatment, and high school GPA entered as covariates, demonstrated significant differences between the ADHD (M = 1.59, SD = .46) and non-ADHD (M = 1.95, SD = .57) groups on overall CRS score, with the corrected model, F (6, 481) = 6.70, $p < .001$, R^2 = .08, η_p^2 = .08, current medication use, F (1, 481) = 4.60, p = .03, η_p^2 = .01, high school GPA, F (1, 481) = 9.87, p = .002, η_p^2 = .02, and ADHD status, F (1, 481) = 6.42, p = .01, η_p^2 = .01, all emerging as significant predictors. The direction of these effects was as expected (i.e., current medication use, lifetime and current psychosocial treatment, higher high school GPA, and non-ADHD status were associated with better preparedness). The raw score mean difference effect size between the ADHD and non-ADHD groups on the overall CRS was found to fall directly between Cohen's (1988) standard for medium (d = .5) and large (d = .8) effect sizes, with the ADHD group scoring significantly lower (d = .65) than the non-ADHD group.

Analyses of Self-Determination, Daily Living, and Academic Scale Scores

Follow-up ANCOVA tests were run to investigate possible ADHD vs. non-ADHD differences in the three specific CRS domains. Bonferroni corrections were applied in these analyses to control for possible inflation of Type I error due to multiple comparisons, with a statistical significance level set at $p < .017$ (i.e., .05/3) for these tests. The ADHD group (M = 1.61, SD = .50) scored significantly lower than the non-ADHD group (M = 1.93, SD = .65) on Self-Determination. With lifetime and current medication use, lifetime and current psychosocial treatment, high school GPA, and predominant ADHD type presentation entered as covariates, the corrected model, F (7, 484) = 4.72, $p < .001$, $\eta_p^2 = .07$, high school GPA, F (1, 484) = 7.73, $p = .006$, $R^2 = .07$, $\eta_p^2 = .02$, , and ADHD status, F (1, 484) = 6.05, $p = .01$, $\eta_p^2 = .01$ were found to be significant independent predictors, and predominant ADHD type presentation neared significance, F (1, 484) = 4.26, $p = .04$, $\eta_p^2 = .01$. The effect size for ADHD and non-ADHD group differences on Self-Determination (d = .48) was at the medium threshold (Cohen, 1988).

The ADHD group (M = 1.63, SD = .60) also scored significantly lower than non-ADHD peers (M = 2.07, SD = .61) on the Daily Living scale. With lifetime and current medication use, lifetime and current psychosocial treatment, and high school GPA entered as covariates, the corrected model was significant, F (6, 485) = 6.93, $p < .001$, $R^2 = .08$, $\eta_p^2 = .08$; and ADHD status, F (1, 485) = 10.77, $p = .001$, $\eta_p^2 = .02$, emerged as a significant predictor, and high school GPA, F (1, 485) = 4.47, $p = .04$, $\eta_p^2 = .01$ neared significance. The effect size for this analysis between the ADHD and non-ADHD groups (d = .72) was close to large (Cohen, 1988).

Regarding Academic readiness, the ADHD group scored significantly lower (M = 1.50, SD = .56) than the non-ADHD group (M = 1.86, SD = .66). With lifetime and current

medication use, lifetime and current psychosocial treatment, high school GPA, and predominant ADHD type presentation entered as covariates, the corrected model was significant F (7, 484) = 5.67, $p < .001$, $R^2 = .08$, $\eta_p^2 = .08$; high school GPA, F (1, 484) = 11.85, $p = .001$, $\eta_p^2 = .02$, and ADHD status, F (1, 484) = 6.06, $p = .006$, $\eta_p^2 = .01$ emerged as independent predictors, current medication use, F (7, 484) = 4.92, $p = .03$, $\eta_p^2 = .01$; and predominant ADHD type presentation, F (1, 484) = 4.63, $p = .03$, $\eta_p^2 = .01$, neared significance. The size of the difference between the ADHD and non-ADHD groups ($d = .56$) exceeds Cohen's (1988) convention for a moderate effect.

Analyses of Self-Determination, Daily Living, and Academic Subscale Scores

Planned analyses included ANCOVAs to examine subscale-level differences between the ADHD and non-ADHD group. Unless noted, variables included as covariates at the scale-level (e.g., Self-Determination) were duplicated in the respective subscales' analyses (e.g., Self-knowledge, Self-advocacy/communication, Self-management). Just as for the scale-level analyses, Bonferroni corrections with $p < .017$ set as the significance criterion were utilized. For brevity, description of each domain's subscale results is abbreviated, with further statistical detail available in Tables 1 and 2.

Self-Determination subscales. On the Self-Knowledge subscale, the ADHD group scored lower ($M = 2.08$, $SD = .76$) than the non-ADHD group ($M = 2.47$, $SD = .90$; $d = .43$). Additionally, those with predominantly IA presentation tended to be less prepared than those with the C (i.e., hyperactivity and inattention) presentation. The ADHD group also scored significantly lower ($M = 1.38$, $SD = .61$) than the non-ADHD group ($M = 1.57$, $SD = .72$; $d = .27$) on Self-Advocacy/Communication Skills. The corrected model, predominant ADHD type presentation, and ADHD status were all significant predictors. The ADHD group ($M = 1.36$, $SD = .58$) also scored lower than the non-ADHD group ($M = 1.74$, $SD =$

.68; *d* = .57) on the Self-Management subscale, but this finding was not statistically significant (*p* = .15).

Daily Living subscales. The ADHD group (*M* = 1.70, *SD* = .57) scored lower than the non-ADHD group (*M* = 2.02, *SD* = .63; *d* = .51) on the Self-Care subscale; although this was a "trend-level" difference (corrected *p* = .018). In contrast, the ADHD group (*M* = 1.64, *SD* = .90) scored significantly lower than the non-ADHD (*M* = 2.13, *SD* = .79; *d* = .61) on the Organization subscale, with the corrected model and ADHD status being significant predictors. The ADHD group (*M* = 1.54, *SD* = .73) also scored significantly lower than the non-ADHD group (*M* = 2.05, *SD* = .71; *d* = .72) on the Time Management subscale. The corrected model, high school GPA, and ADHD status were significant predictors, and current medication use neared significance.

Academic subscales. After the Bonferroni correction the ADHD group's report of Self-Knowledge (*M* = 1.60, *SD* = .70) was lower than the non-ADHD group (*M* = 1.83, *SD* = .77; *d* = .30), although this was a "trend-level" difference (i.e., without Bonferroni correction, .05 < *p* < .10). At the predictor level, the corrected model, current medication use, and high school GPA reached statistical significance. In addition, the ADHD group (*M* = 1.52, *SD* = .63) scored significantly lower than the non-ADHD group (*M* = 1.84, *SD* = .67; *d* = .49) on the Study Skills subscale. The corrected model, high school GPA, predominant ADHD type presentation, and ADHD status were demonstrated to be significant predictors, and current medication use neared significance. Lastly, the ADHD group (*M* = 1.43, *SD* = .67) scored significantly lower than the non-ADHD group (*M* = 1.91, *SD* = .74; *d* = .66) on the Time Management subscale. The corrected model, high school GPA, predominant ADHD type presentation, and ADHD status, were all significant predictors.

Exploratory Analyses

In order to examine the construct validity of the CRS, correlations were run between the CRS and the WFIRS and between the CRS and current GPA. There was a significant negative correlation between the Self-Determination scale scores and the Self-Concept scale scores, $r =$ -.42, $p < .001$. There was also a significant negative correlation between the Daily Living scale scores and the Life Skills scale scores, $r =$ -.53, $p < .001$. There was a significant negative correlation between the Academic scale scores and the School scale scores, $r =$ -.53, $p < .001$. Chi square tests demonstrated a significant difference between the ADHD and non-ADHD groups on college GPA, χ^2 (7, $N = 567$) = 26.25, $p < .001$. The median for the ADHD group was a GPA between 2.6-3.0, and the median non-ADHD group was a GPA between 3.1-3.5. Additionally, there was a significant positive correlation between the Overall CRS scores and college GPA, $r = .23$, $p < .001$. [1]

Discussion

The current study investigated the differences in college readiness between first-year university students with and without ADHD. In support of a priori hypotheses, students with ADHD were found to report lower readiness across *all* measured domains-- self-determination, daily living, and academic skills-- as compared to their non-diagnosed peers. Detailed discussion follows.

Deficits in College Readiness According to ADHD Status

Self-determination skills. Clear deficits (i.e., mainly of medium-sized effects) emerged for these college students with ADHD in the readiness area of self-determination, in comparison to their unaffected peers. More specifically, their ill-preparedness related to self-knowledge (i.e., self-awareness and knowing one's own strengths and weaknesses) and self-advocacy/communication (i.e., speaking up for oneself and one's needs). Maitland and

Quinn (2011) describe how these skills are critical for first-year college students, in that they will be required to perform tasks such as picking a major or contacting financial aid which require self-knowledge and self-advocacy. Students will, likely for the first time, be responsible for arranging and following through on their own accommodations, prescriptions, and psychosocial treatment. This is especially problematic for students with ADHD because they tend to have lower insight about what they perform well at and may be impulsive during conversations with campus staff who provide accommodations and other resources. A lack of self-knowledge and self-advocacy/communication could impede students with ADHD from arranging such assistance that would likely benefit them. This may be a factor contributing to fewer than half of students with ADHD receiving academic accommodations in college (Murray et al., 2014).

While the current data do not allow conclusions to be drawn regarding the etiology of the self-determination deficits noted in college students with ADHD herein, reasonable conjecture suggests several possibilities. Those with ADHD tend to have deficits in executive functioning (Barkley et al., 2008), which negatively impacts goal-directed behavior and task persistence and might interfere with satisfactory self-advocacy and communication (e.g., making and keeping an appointment with financial aid). Individuals with ADHD also tend to exhibit a positive illusory bias (e.g., Hoza et al., 2004), in which they overestimate their abilities. Positive illusory bias can be problematic because if an individual does not recognize their own deficits they are not likely to seek treatment or make attempts at self-improvement (Hoza et al., 2004). Prevatt et al. (2012) found that college students with ADHD do demonstrate a positive illusory bias, and it may contribute to deficits in academic functioning. Because college students with ADHD may be more likely to be poor interpreters of their own behavior and related competencies, their self-

knowledge may suffer and this may lead to difficulties in picking a major or courses that are more suited to their personal skill set and developmental needs.

Daily living skills. Even more distinct (i.e., generally large) deficits were noted for college students with ADHD in the daily-living readiness area. This aspect of readiness evinced the greatest divergence between affected and unaffected students, suggesting those with ADHD are particularly unprepared for managing tasks of daily living such as organization (i.e., keeping track of possessions and managing a clean living space) and time management (i.e., keeping a balanced schedule). These skills are crucial for success in the first year of college so that the student can find the items they need, have an effective study space, or not have to stay up all night to "cram" or complete an academic assignment.

Students with ADHD may again be at especially high risk for falling into maladaptive daily routines due to their characteristic executive skill deficits (e.g., judgment, planning, organization, impulse control) and an impaired ability to accurately judge the passing of time (e.g. Toplak, Dockstader, & Tannock, 2006). Alternatively, it may be that the parents and teachers of many "successful" high-schoolers with ADHD are highly involved in providing structure and assistance for daily living tasks in the home and school settings, more so than those without ADHD. While adaptive in high school, this might limit the opportunity for their children to learn how to organize their possessions and manage their time, and the relative lack of such supervision in a traditional (i.e., boarding) college may prove to be quite problematic for the success of students with ADHD in that setting (Maitland & Quinn, 2011).

Academic readiness skills. Moderate-sized deficits on the part of students with ADHD were also found in the academic readiness area, specifically focused on study skills (i.e., managing assignments, taking notes, preparing for tests, and writing papers) and time

management (i.e., completing daily assignments and planning for long-term assignments). This is problematic because first-year college students are challenged enough by the new, higher standards set for independent thought and analysis and depth of knowledge without a lack of the basic skills necessary for the timely and accurate completion of assignments. It is well documented that students with ADHD perform worse in pre-college school achievement than their non-diagnosed peers (Evans el at., 2014). If a student has not fully developed study skills before arriving at college their struggles will only be exacerbated by the higher academic expectations associated with such higher-level work. Further, academic success may be more of a challenge for students with ADHD because they usually have more difficulty breaking down tasks and creating a plan when they feel overwhelmed by schoolwork, likely related to executive functioning deficits (e.g., Barkley et al., 2008), This can be related to higher emotional reactivity and difficulties in problem solving, as well, also characteristic of the disorder.

Additional Findings Regarding the Nature of College Readiness

Relationship between college readiness and student outcomes. As noted, students with ADHD were found to be less prepared for college across several domains, but it remains to be established exactly what this means in terms of success, retention, and graduation. However, the exploratory analyses shed some limited light on what lower readiness might mean for these first-year students.

The CRS was compared to scales on the WFIRS, a measure of impairment. The relationship between the overall CRS and the WFIRS scores was as expected (i.e., the higher the college readiness score the lower the impairment score), and logical subscale-level relationships were noted as well (e.g., CRS Self-determination negatively related to WFIRS Self-concept impairment). These relationships support the validity of the CRS

because it appropriately relates to the WFIRS, which is a well-established measure (Canu et al., 2016). A significant positive correlation between CRS score and college GPA was also found. Students with ADHD scored lower on the CRS, and had a lower GPA. This relationship speaks to the validity of the CRS, as well, because it appropriately relates to an independent measure of college success (i.e., GPA).

Other variables shown to influence college readiness. When interpreting the results, it is apparent that other factors beyond the CRS impacted college readiness. As noted in the results, current medication use, psychosocial treatment, and higher high school GPA were associated with better preparedness. Additionally, predominant ADHD presentation appeared to influence aspects of college readiness. These additional factors are explored below.

Having received treatment for ADHD was associated with better college readiness. Medication use is typically associated with ADHD symptom reduction, and evidence for reduction in impairment is mixed (Weyandt et al., 2014); however, it is possible that families that sought medication treatment provided an environment that helped students to be more college ready. Perhaps treatment-seeking parents were more aware of their children's ADHD symptoms and the need to mitigate these impairments. Such awareness may have facilitated learning better ways to manage their symptoms, including via development of skills and organizational systems that translate into college readiness. Additionally, if medication reduced ADHD symptoms, it may have been easier for these treated students to focus and develop key academically- and life-oriented skills. Weyandt, Oster, Gudmundsdottir, DuPaul, and Anastopoulos (2017) found that stimulant medication was associated with greater impulse control and greater vigilance, specifically when investigating college students with ADHD. If taking medication leads to improvements in

impulse control and vigilance, then it is possible that these students had more opportunities to learn more skills to because they are more alert and less impulsive. Medication use has also been associated with improvements in executive functioning (DuPaul et al., 2012). If a student had more developed executive functioning abilities, they were likely able to more easily establish college readiness skills because executive functioning contributes to academics, self-determination, and daily living. In addition, the presence of any psychosocial treatment was associated with more readiness; this finding is discussed further in clinical implications.

Interestingly, high school GPA was a significant predictor for college readiness on self-determination and academic skills but not on daily living skills. There may be other contributing variables to why GPA is associated with higher college readiness. GPA might be reflecting certain personality factors such as conscientiousness, which has been found to greatly impact success in school (Dumfart & Neubauer, 2016). A student that is more conscientious may also more easily develop self-determination and daily living skills because they are more aware of how they are interacting with others and more aware of their environment. GPA may also be reflecting intelligence or general cognitive ability, and thereby could be acting as an independent predictor for college readiness. A student that is more intelligent may more quickly be able to develop the ability to reflect on their own thought processes (i.e., self-determination; Swanson, 1992) and have a greater ability to perform well in academics.

A significant difference between the common ADHD presentations (i.e., inattentive or hyperactive/impulsive and combined) was found regarding self-determination and academic skills; specifically, those participants with the predominantly inattentive presentation had lower mean scores than peers with hyperactive/impulsive and combined

presentations. It is often the case that hyperactive/impulsive symptoms are detected earlier in a child's life because they are more easily observable than inattentive symptoms (Ramtekkar, Reiersen, Todorov, & Todd, 2010). Moldavsky, Groenewald, Owen, and Sayal (2013) found that teachers were more likely to identify and recommend intervention if the student presented with a combined presentation instead of an inattentive presentation. If the students with hyperactive/impulsive and combined presentations were identified earlier and more often than the students with inattentive presentation, they may have also received more interventions. The students with combined presentation may thereby have obtained better self-determination and academic college readiness skills because they were receiving the help they needed in primary and secondary grades.

Other possible influences: Measurement overlap. When interpreting the results, it is important to note possible measurement issues. It is possible that a strong relationship between ADHD status and deficits in college readiness were found because of measurement overlap. Certain items on CSS are reflected on the CRS. For instance, an item on the CSS states "Am not prepared for work or assigned tasks," and an item on the CRS states "I know how to prepare for tests and final exams." Additionally, it is possible that a correlation between the CRS and the WFIRS was found because of overlap between these measures. For instance, an item on the WFIRS states "Problems taking notes," and an item on the CRS states "I know how to take notes from my reading assignments." Logically, it is almost to be expected that a participant who endorses not being prepared or having problems taking notes would also endorse not knowing how to prepare or not knowing how to take notes. Therefore, overlap between the measure capturing ADHD status and the measure capturing college readiness, as well as the measure capturing college readiness and the measure

capturing impairment, could be a possible explanation for the associations, and analyses exploring this possibility are a direction for future research (see below).

Clinical Implications

Clearly, the magnitude and breadth of deficits reported by the students with ADHD in this study suggests they face an uphill battle in college, even beyond their challenges related to executive functioning and other core deficits inherent to the disorder. Just as clearly, these findings suggest that additional intervention is warranted before (e.g., in senior year of high school or the transition summer afterwards) or early in college to rectify this imbalance and to help level the playing field in higher education for affected individuals. As noted in the introduction, there are factors that might moderate low college readiness. The type of parenting a child receives and early cognitive or behavioral interventions might impact how a student performs later in life. While longitudinal studies are needed to more directly investigate the impact of these factors, some conclusions can be draw as to what factors are to likely help a student be successful in college.

There is evidence that the more parents collaborate with their child, instead of being uninvolved or overly controlling, the better the student performs academically (Pomerantz, Moorman, & Litwack, 2007). “Paraprofessional” teachers and parents can and should focus on facilitating skills at age-appropriate junctures in adolescents with ADHD. Parents tend to guide and functionally assist students with ADHD more than unaffected offspring, which can be beneficial in the short-term but takes away learning opportunities for long-term benefits from the students (Maitland & Quinn, 2011). The current findings suggest that parents should manage experiences that can lead to readiness skill development as opposed to simply competing tasks for students. For example, a student may struggle to remember to take their medication daily. A parent may be tempted to monitor their child’s medication use

by reminding them daily to take it. Instead of the parent being the one to monitor the medication, when age appropriate, the parent may consider purchasing a pill sorter for the student so that student can learn to monitor their own medication use. Coaching parents to manage experiences instead of completing tasks for the student could be incorporated into existing, effective parent training psychosocial interventions for adolescents, such as that documented by Sibley et al. (2013) that improved some current academic functioning and ADHD symptoms. Some of the specific camps and after school programs discussed in the introduction (e.g., The Challenging Horizons Program and Summer Treatment Programs) also address parent-child relations as well as academic functioning. Teaching parents how to manage their child's difficulties in the present moment, along with preparing them for future success may be a crucial step toward students with ADHD being more college-ready.

Behavior therapy, which typically includes parent training, teacher-delivered behavioral interventions, and peer relation interventions, is shown to typically reduce ADHD symptoms as well as some reduction in impairment (Sibley et al., 2014). More behavioral therapy interventions for adolescents with ADHD, such as The Challenging Horizons Program (CHiP; Evans et al., 2011) and the Summer Treatment Program (STP; Fabiano et al., 2014), are needed. The CHiP is an afterschool, yearlong program that provides interpersonal and academic skills training for adolescents with ADHD. This program has yielded evidence for improved ADHD symptoms and impairment (Evans et al., 2011). Similarly, the STP for adolescents is an 8-week day camp program that employs reward and response cost programs, and participants have been found to demonstrated functional improvement in the home, classroom, and non-academic contexts (Sibley et al., 2011). When looking to inform pre-college interventions, evidence should be pulled from what we do know of these programs.

Fewer than half of students with ADHD receive academic accommodations, and the accommodations they do receive may not be adequate (Murray et al., 2014). Extended test time is the most commonly received accommodation, but it has been found that adolescents with ADHD perform equivalent to non-affected peers on timed tasks (Lewandowski, Lovett, Parolin, Gordon, & Codding, 2007) and it is possible that students with ADHD who receive extra time might actually have an academic *advantage* (Miller, Lewandowski, & Antshel, 2015). There is evidence for note-taking and self-management accommodations being useful earlier in life (Evans et al., 2014), but how helpful these accommodations are in college has not been examined empirically, nor how receiving these accommodations during pre-college education effects success in college (Green & Rabiner, 2012). This all indicates that more research on the efficacy and prognostic value of academic accommodations for students with ADHD throughout education is needed. Finally, research on potential remedial academic and life skill interventions for students with ADHD who are currently enrolled in college seems like a rich avenue for future studies, as well.

While empirically supported, cognitive-behavioral interventions for enrolled college students to address their ADHD exist (Canu & Wymbs, 2015; He & Antshel, 2016), preventative interventions that specifically target college readiness for younger students with ADHD are not to be found. It has yet to be established whether evidence based interventions for adolescents with ADHD help a student be college ready (e.g., STP, CHiP). Maitland and Quinn (2011) outline steps for college preparation, but these steps have not been empirically tested. When looking for interventions to inform pre-college psychosocial treatment, evidence from research involving adolescents (e.g., Evans et al., 2011; Sibley et al., 2011), college students (e.g., Anastopoulos & King, 2014; Eddy et al., 2014; Parker,

Hoffman, Sawilowsky, & Rolands, 2013), and adults (e.g., Safren et al. 2005; Solanto et al., 2010) should be combed to identify developmentally-appropriate techniques for adaptation.

Additionally, the CRS (Maitland & Quinn, 2011) represents an internally-consistent measure of college readiness that clinicians might employ with individuals with ADHD to tailor early interventions to clients' individual needs. The CRS has been found in the current study to be correlated with related impairment. It would likely be beneficial for clinicians to understand which areas their particular clients are struggling with to inform intervention. The CRS may also help the client themselves to better recognize which areas of functioning need improvement, something those with ADHD tend to struggle with.

Limitations and Future Directions

The current study examined self-reports of ADHD symptoms, impairment, and college readiness. Future research should consider collateral reports to bolster the accuracy and confidence in such data and related findings. Additionally, presence of ADHD was not confirmed beyond self-reported diagnosis and symptoms, although there was clear evidence for participants with ADHD meeting diagnostic criteria. This approach is not as ideal and as having multiple informants' perspectives; however, there is evidence that adults' self-reports of ADHD symptoms are reliable and have acceptable agreement with those of other informants (Dias et al., 2008; Kooij et al., 2008). As such, the current sample is still likely representative of college students with and without ADHD.

College readiness was measured during these students' first year in their university curriculum, but gathering data before arriving to college may portray a more accurate representation of the readiness of beginning college students. However, there is relatively little evidence suggesting a decline in adjustment as students advance in college years that could be attributable to the development of new, adaptive skills. For instance, Blase et al.

(2009) found that the difficulties college students with ADHD experience are present early on in their college careers, and tend to be stable over time for those who remain in college. Additional longitudinal studies tracking students from high school until college graduation are needed to better understand the impacts of college readiness on later higher education and then into "independent" adulthood and employment.

In addition, it is important to note possible procedural issues. While participants were recruited from three universities, the majority of them were European-American, and so generalization to minority groups should be considered with caution. The sample was also biased toward females. Some studies show that more males than females are diagnosed with ADHD early in life; however, the distribution across sexes is more even as individuals age (Rucklidge, 2010). Evidence supports females that *are* diagnosed being equally impaired as male counterparts, and there is similar consistency in response to treatment (Rucklidge, 2010). Therefore, findings from the current study are likely still equally applicable to male and female college students. As previously mentioned, there is possible measurement overlap, which could be influencing to the results of the current study. Future studies might productively identify the items with high overlap between the CRS and the CSS, in particular, and examine the relationship. Additionally, when interpreting the results of the CRS, the relative clinical impact of the mean score differences between groups should be noted. The Likert scale ranged from 0-3, and most means for both groups fell between "sometimes" and "often" (e.g., 1-2). Although there were statistically significant differences between the ADHD and non-ADHD groups and these were generally near medium in effect size, the real-life impact of the difference between these scores may not always be observable. This does not exclude the possibility, however, that such college readiness differences, at key times or for high-stakes tests or assignments, do not translate into bona

fide impaired performance (e.g., as might be suggested by the noted differences in current college GPA).

Finally, independent research is needed to replicate these findings in order to bolster confidence and encourage application in clinical and other settings. Future research should also further examine the direct relationship between high school GPA and college readiness. If high school GPA is a large contributing factor to college readiness, there should be investigation into the nature of the relationship and intervention before arriving at college would be even more warranted. Future research should also further examine the differences between the predominant ADHD presentations in terms of college readiness. It may be necessary to consider differences in the goals for intervention between individuals with predominantly inattentive or hyperactive/impulsive presentations. Individuals with ADHD are often found to have executive functioning deficits, and these deficits likely play a role in the degree of college readiness as many items on the CRS address executive functioning (e.g., “I can organize my room and possessions with few or no reminders”). Therefore, executive functioning as a possible mediator for college readiness should also be examined.

Conclusion

The current study examined college readiness, which has elsewhere been defined in terms of skills in self-determination, daily living, and academic domains (Maitland & Quinn, 2011), for students with ADHD as compared to their non-diagnosed peers. Results indicate that first-year students with ADHD reported significantly lower readiness for college in all of these broad areas. Overall, the findings suggest that specific intervention is needed for students with ADHD in high school or earlier to address such deficits, and such future programs should be informed by the results reported here as well as other relevant programs that have been implemented for other at-risk populations.

Endnotes

[1] Correlations between the CRS and WFIRS as well as the CRS and current GPA were significant and approximately of the same strength for the ADHD group and non-ADHD group.

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Table 1

Analyses of CRS Subscales Meeting Threshold for Statistical Significance

Subscale	Corrected Model	High School GPA	Current Psychosocial Treatment	Predominant ADHD Presentation	ADHD Status
SD Self-Knowledge	4.63***, R^2 = .06	9.58**, η_p^2 = .02	w/o tx 2.42 (.88), w/tx 1.67 (.83) *d* = .87*	IA = 1.56 (.89), HI/Combined = 2.20 (.71) *d* = .80*	Non-ADHD = 2.45 (.89), *ADHD* = 2.08 (.76) *d* = .45**
SD Self-advocacy	2.26*, R^2 = .03,	N/A	N/A	IA = .96 (.57), HI/Combined = 1.48 (.59) *d* = .90*	Non-ADHD = 1.57 (.72), ADHD = 1.38 (.61) *d* = .29*
DL Organization	4.55***, R^2 = .05	N/A	N/A	N/A	Non-ADHD = 2.14 (.79), ADHD = 1.64 (.90) *d* = 59**
DL Time Management	7.00***, R^2 = .08	8.87**, η_p^2 = .02	N/A	N/A	Non-ADHD = 2.05 (.70), ADHD = 1.54 (.73) *d* = .71***
AC Study Skills	4.01***, R^2 = .06	6.41**, η_p^2 = .01	N/A	IA = 1.20 (.34), HI/Combined = 1.56 (.67) *d* = .71*	Non-ADHD = 1.84 (.66), ADHD = 1.51 (.63) *d* = .51*
AC Time Management	6.80***, R^2 = .09	15.44***, η_p^2 = .03	N/A	IA = 1.10 (.74), HI/Combined = 1.50 (.69) *d* = .56*	Non-ADHD = 1.91 (.74), ADHD = 1.43 (.67) *d* = .68***

Note. CRS = College Readiness Scale (Maitland & Quinn, 2011). Unlabeled values in Current Psychosocial Treatment, Predominant Attention-Deficit/Hyperactivity Disorder (ADHD) Presentation, and ADHD status are subgroup *M* (SD). CRS Scale abbreviations: SD = Self-Determination, DL = Daily Living, AC = Academic. * = < .05, ** = < .01, *** = < .001. Degrees of freedom (*df*) for Current Psychosocial Treatment, Predominant ADHD Type Presentation, and ADHD Status = 1.

Table 2

Analyses of CRS Subscales with Trend-level ($p < .10$) Differences

Subscale	Corrected Model	Current Medication Use	ADHD Status
DL Self-Care	4.63****, $R^2 = .06$	On = 1.74 (.60), Off = 2.00 (.62) d = 42***	Non-ADHD = 2.02 (.63), ADHD = 1.69 (.55) *d* = .53**
DL Time Management	7.00****, $R^2 = .08$	On = 1.73 (.83), Off = 2.01 (.71) d = .39 *	N/A
AC Self-Knowledge	2.14****, $R^2 = .05$	N/A	Non-ADHD = 1.83 (.77), ADHD = 1.60 (.70) *d* = .30*
AC Study Skills	4.01****, $R^2 = .06$	On = 1.62 (.68), Off = 1.82 (.66) d = .30*	N/A

Note. Unlabeled values in Current Medication Use and ADHD status are subgroup *M* (SD). CRS Scale abbreviations: DL = Daily Living, AC = Academic. * = < .10, ** = < .05, *** = < .01, **** = < .001. Degrees of freedom (*df*) for Current Medication Use and ADHD Status = 1.

Appendix A

College Readiness Scale

College Readiness Survey

52. Please rate yourself in each skill area.

Self-determination: Self-knowledge

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I am aware of my talents, interests and my dreams for the future.	◯	◯	◯	◯
I am aware of my feelings and reactions when I have to get used to new people, places and situations, and what helps me adjust.	◯	◯	◯	◯
I am aware of my strengths and weaknesses in my academic and learning skills.	◯	◯	◯	◯

53. Self-determination: Self-advocacy/communication skills

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I introduce myself to new people and hold conversations with others.	◯	◯	◯	◯
I express my strengths and weaknesses to my teachers or other people.	◯	◯	◯	◯
I admit when I don't understand something in class and comfortably ask for help.	◯	◯	◯	◯
I find the help or support I need when I have a problem.	◯	◯	◯	◯
I express my thoughts well, even when I have a different view or opinion, and stand firm when needed.	◯	◯	◯	◯
I talk with other people involved in any conflict and problem-solve to handle the situation.	◯	◯	◯	◯

54. Self-determination: Self-management

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I listen and understand what my friends and family members are saying about me without getting defensive	◯	◯	◯	◯
I regularly set realistic goals for myself in all areas of my life	◯	◯	◯	◯
I develop plans to reach my goals and put them in to action	◯	◯	◯	◯
I periodically think about my progress in reaching my goals and make modifications as needed	◯	◯	◯	◯
I persistently deal with any challenge without becoming frustrated until I find an acceptable solution	◯	◯	◯	◯
I observe my emotions and deal with them productively	◯	◯	◯	◯

55. Daily living skills: Self-care

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I wash and care for my own clothes	◯	◯	◯	◯
I take any medications I need with few or no reminders	◯	◯	◯	◯
I make my own doctor appointments and call to refill my prescription medications	◯	◯	◯	◯
I prepare meals or choose healthy foods for my daily meals	◯	◯	◯	◯
I get adequate exercise to remain healthy	◯	◯	◯	◯
I manage money well and can be trusted with credit cards	◯	◯	◯	◯
I make good decisions about how to handle stress	◯	◯	◯	◯

56. Daily living skills: Organization

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I organize my room and possessions with few or no reminders	◯	◯	◯	◯
I keep track of my important possessions and find them when I need them	◯	◯	◯	◯

57. Daily living skills: Time management

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I awaken myself each day and get out the door each day without much help from others	◯	◯	◯	◯
I send myself to bed each night at a reasonable time	◯	◯	◯	◯
I make good decisions about how to balance fun, chores, and school work	◯	◯	◯	◯
I get places on time with no problem	◯	◯	◯	◯

58. Academic skills: Self-knowledge

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I know my learning style and can find ways to help me learn and study best in different classes	◯	◯	◯	◯
I know when and where I need to study to get the best results	◯	◯	◯	◯
I know how to motivate myself to face difficult assignments	◯	◯	◯	◯

59. Academic skills: Study skills

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I take notes from my reading assignments	◯	◯	◯	◯
I take complete notes in class that are useful to me when I study for exams	◯	◯	◯	◯
I identify what is important when I am reading	◯	◯	◯	◯
I organize my ideas and write and edit my own papers	◯	◯	◯	◯
I prepare for tests and final exams	◯	◯	◯	◯
I review my class notes, assigned readings, and other materials on a regular basis	◯	◯	◯	◯
I use the help available in school when I don't understand something or want to improve how I study	◯	◯	◯	◯

60. Academic skills: Time management

	Never or Not at All	Sometimes or Somewhat	Often or True	Very Often or Very True
I set up my own study schedule.	◯	◯	◯	◯
I consistently complete daily assigned homework	◯	◯	◯	◯
I have developed and use a system for keeping track of due dates for all of my assignments	◯	◯	◯	◯
I stay on top of my reading assignments	◯	◯	◯	◯
I write assigned papers, study for tests, and complete long-term projects in a timely manner	◯	◯	◯	◯

Appendix B

Demographics Form

Demographics

Please answer the following questions. All responses will be kept confidential.

1. Your sex:

- ◯ Female
- ◯ Male

2. Your Date of Birth:

Please enter the month, day and year MM / DD / YYYY

3. Your Age (if you are not 18 to 25 years old you are not eligible to participate):

◯ 18 ◯ 19 ◯ 20 ◯ 21 ◯ 22 ◯ 23 ◯ 24 ◯ 25

4. Your Ethnicity:

- ◯ European American
- ◯ African American
- ◯ American Indian
- ◯ Hispanic/Latino
- ◯ Asian/Asian-American

Biracial or Other (please specify):

5. Please indicate the location that you consider to be your "hometown," where you "grew up" or lived the longest (city, state):

6. Select the choice that you think best describes your hometown:

- ◯ Urban
- ◯ Suburban
- ◯ Rural

7. Your highest level of education completed (select one):

8. What was your high school grade point average (GPA)?

9. What is your college grade point average (GPA)?

10. What was your college entrance exam score (if applicable)?

ACT Exam Score

SAT Exam Score (out of 1600)

11. When did you take the college entrance exams?

	MM	DD	YYYY
ACT	/	/	
SAT	/	/	

12. Have you ever received medication for a mental health problem (such as ADHD, depression, or anxiety) that was prescribed to you by a medical professional?

- ◯ Yes
- ◯ No

13. If yes, what type of medication are you currently taking?

- ◯ Stimulant for ADHD such as Ritalin, Focalin or Adderall
- ◯ Anti-depressant such as Prozac, Zoloft, or Paxil
- ◯ Anti-anxiety such as Beta Blocker, Xanax, or Ativan
- ◯ Not currently taking medication for a mental health problem
- ◯ Other (please specify)

14. What type of medication have you taken in the past?

- ◯ Stimulant for ADHD such as Ritalin, Focalin or Adderall
- ◯ Anti-depressant such as Prozac, Zoloft, or Paxil
- ◯ Anti-anxiety such as Beta Blocker, Xanax or Ativan
- ◯ Did not take medication in the past for a mental health problem
- ◯ Other (please specify)

15. Have you ever participated in a psychosocial treatment (such as individual therapy or group therapy) for a mental health problem?

- ◯ Yes
- ◯ No

16. If yes, what type of psychosocial treatment are you currently participating in?

- ◯ Individual cognitive behavioral therapy for ADHD (may be referred to as ADHD coaching)
- ◯ Cognitive behavioral group therapy for ADHD (may be referred to as ADHD coaching)
- ◯ Other type of group or individual therapy (please specify)

17. If yes, what type of psychosocial treatment did you or your parents previously participate in?

- ◯ Parent behavior management training for parents of children with ADHD
- ◯ Individual cognitive behavioral therapy for ADHD (may be referred to as ADHD coaching)
- ◯ Cognitive behavioral group therapy for ADHD (may be referred to as ADHD coaching)
- ◯ Other type of group or individual therapy (please specify)

18. Have you ever been given a formal diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) or Attention-Deficit Disorder (ADD)?

- ◯ Yes
- ◯ No

19. If yes, who made the diagnosis?

- ◯ Medical doctor (such as pediatrician, family practitioner, or psychiatrist)
- ◯ Doctoral level therapist (such as psychologist)
- ◯ Master's level therapist (such as counselor or social worker)

20. If yes, how old were you when the diagnosis was made?

- ◯ 4 years old or younger
- ◯ 5-7 years old
- ◯ 8-12 years old
- ◯ 13-17 years old
- ◯ 18 years old or older

21. Have you ever been given a formal diagnosis of any of the following (check any that apply, or skip if none):

- ☐ Reading Disorder (Dyslexia)
- ☐ Mathematics Disorder
- ☐ Mood Disorder/Emotional Problem (such as Depression or Anxiety)
- ☐ Physical Disability (such as a visual, motor, or hearing problem)

Appendix C

Current Symptoms Scale- Self Report

Barkley New

26. Instructions: Please select the response next to each item that best describes your behavior again *during the past six months.* If you are taking medication to treat ADHD (such as Ritalin) or have taken it in the past six months please respond to these items based on your non-medicated behavior.

	Never/Rarely	Sometimes	Often	Very Often
Make decisions impulsively	◯	◯	◯	◯
Have difficulty stopping activities or behavior when I should do so	◯	◯	◯	◯
Start a project or task without reading or listening to directions carefully	◯	◯	◯	◯
Show poor follow-through on promises or commitments made to others	◯	◯	◯	◯
Have trouble doing things in the proper order or sequence	◯	◯	◯	◯
Am more likely to drive a motor vehicle much faster than others (excessive speeding)	◯	◯	◯	◯
Find it difficult to tolerate waiting; impatient	◯	◯	◯	◯
Am unable to inhibit my reactions or responses to events or others	◯	◯	◯	◯
Have difficulty changing my behavior when I am given feedback about my mistakes	◯	◯	◯	◯
Prone to daydreaming when I should be concentrating on something	◯	◯	◯	◯
Procrastinate or put off doing things until the last minute	◯	◯	◯	◯
Make impulsive comments to others	◯	◯	◯	◯
Likely to take short cuts in my work and not do all that I am supposed to do	◯	◯	◯	◯
Likely to skip out on work if its boring or easy to do	◯	◯	◯	◯
Can't seem to defer gratification or to put off doing things that are rewarding now so as to work for a later goal	◯	◯	◯	◯
Likely to do things without considering the consequences for doing them	◯	◯	◯	◯
Change my plans at the last minute on a whim or last minute impulse	◯	◯	◯	◯
Have a poor sense of time	◯	◯	◯	◯
Waste or mismanage my time	◯	◯	◯	◯
Fail to consider past relevant events or past personal experiences before responding to situations	◯	◯	◯	◯
Do not think about the future as much as others of my age seem to do	◯	◯	◯	◯
Am not prepared for work or assigned tasks	◯	◯	◯	◯
Fail to meet deadlines for assignments	◯	◯	◯	◯
Have trouble planning ahead or preparing for upcoming events	◯	◯	◯	◯
Have difficulties with mental arithmetic	◯	◯	◯	◯
Not able to comprehend what I read as well as I should be able to do; have to re-read material to get its meaning	◯	◯	◯	◯
Can't seem to remember what I previously heard or read about	◯	◯	◯	◯
Can't seem to accomplish the goals I set for myself	◯	◯	◯	◯
Am late for work or scheduled appointments	◯	◯	◯	◯
Have trouble organizing my thoughts or thinking clearly	◯	◯	◯	◯
Am not aware of things I say or do	◯	◯	◯	◯

Can't seem to hold in mind things I need to remember to do	◯	◯	◯	◯
Have difficulty being objective about things that affect me	◯	◯	◯	◯
Find it hard to take other people's perspectives about a problem or situation	◯	◯	◯	◯
Have difficulty keeping in mind the purpose or goal of my activities	◯	◯	◯	◯
Forget the point I was trying to make when talking to others	◯	◯	◯	◯
When shown something complicated to do, cannot keep the information in mind so as to imitate or do it correctly	◯	◯	◯	◯
Give poor attention to details in my work	◯	◯	◯	◯
Find it difficult to keep track of several activities at once	◯	◯	◯	◯
Can't seem to get things done unless there is an immediate deadline	◯	◯	◯	◯
Dislike work or school activities where I must think more than usual	◯	◯	◯	◯
Have difficulty judging how much time it will take to do something or get somewhere	◯	◯	◯	◯
Have trouble motivating myself to start work	◯	◯	◯	◯
Am quick to get angry or become upset	◯	◯	◯	◯
Am easily frustrated	◯	◯	◯	◯
Over-react emotionally	◯	◯	◯	◯
Have difficulty motivating myself to stick with my work and get it done	◯	◯	◯	◯
Can't seem to persist in things I do not find interesting	◯	◯	◯	◯
Do not put as much effort into my work as I should or as others are able to do	◯	◯	◯	◯
Have trouble staying alert or awake in boring situations	◯	◯	◯	◯
Am easily excited by activities going on around me	◯	◯	◯	◯
Am not motivated to prepare in advance for things I know I am supposed to do	◯	◯	◯	◯
Am easily bored	◯	◯	◯	◯
Others tell me I am lazy or unmotivated	◯	◯	◯	◯
Have to depend on others to help me get my work done	◯	◯	◯	◯
Things must have an immediate payoff for me or I do not seem to get them done	◯	◯	◯	◯
Have difficulty resisting the urge to do something fun or more interesting when I am supposed to be working	◯	◯	◯	◯
Can't seem to sustain friendships or close relationships as long as other people	◯	◯	◯	◯
Am inconsistent in the quality or quantity of my work performance	◯	◯	◯	◯
Don't seem to worry about future events as much as others	◯	◯	◯	◯
Don't think about or talk things over with myself before doing something	◯	◯	◯	◯
Am unable to work as well as others without supervision or frequent instruction	◯	◯	◯	◯
Have trouble doing what I tell myself to do	◯	◯	◯	◯
Lack self-discipline	◯	◯	◯	◯
Have difficulty using sound judgment in problem situations or when under stress	◯	◯	◯	◯
Have trouble following the rules in a situation	◯	◯	◯	◯
Am not very flexible in my behavior or approach to a situation; overly rigid in how I like things done	◯	◯	◯	◯
Have trouble organizing my thoughts	◯	◯	◯	◯
Have difficulties saying what I want to say	◯	◯	◯	◯

Am unable to come up with or invent as many solutions or problems as others seem to do	◯	◯	◯	◯
Am often at a loss for words when I want to explain something to others	◯	◯	◯	◯
Have trouble putting my thoughts down in writing as well or as quickly as others	◯	◯	◯	◯
Feel I am not as creative or inventive as others of my level of intelligence	◯	◯	◯	◯
In trying to accomplish goals or assignments, find that I am not able to think of as many ways of doing things as others	◯	◯	◯	◯
Have trouble learning new or complex activities as well as others	◯	◯	◯	◯
Have difficulty explaining things in their proper order or sequence	◯	◯	◯	◯
Can't seem to get to the point of my explanations as quickly as others	◯	◯	◯	◯
Am unable to "think on my feet" or respond as effectively as others to unexpected events	◯	◯	◯	◯
Am clumsy; not as coordinated in my movements as others	◯	◯	◯	◯
Have poor or sloppy handwriting	◯	◯	◯	◯
Have difficulty arranging or doing my work by its priority or importance; can't "prioritize" well	◯	◯	◯	◯
Am slower to react to unexpected events	◯	◯	◯	◯
Get silly, clown around, or act foolishly when I should be serious	◯	◯	◯	◯
Can't seem to remember things I have done or places I have been as well as others seem to do	◯	◯	◯	◯
Am accident prone	◯	◯	◯	◯
Have difficulties managing my money or credit cards	◯	◯	◯	◯
Am less able to recall events from my childhood compared to others	◯	◯	◯	◯

Appendix D

Childhood Symptom Scale- Self-Report

Barkley Childhood

38. Instructions: Please select the response next to each item that best describes your behavior *when you were a child ages 5 to 12.* If you took medication to treat ADHD (such as Ritalin) as a child, please respond based on your non-medicated behavior.

	Never or Rarely	Sometimes	Often	Very Often
Failed to give close attention to details or made careless mistakes in my work	◯	◯	◯	◯
Fidgeted with hands or feet or squirmed in seat	◯	◯	◯	◯
Had difficulty sustaining my attention in tasks or fun activities	◯	◯	◯	◯
Left my seat in classroom or in other situations in which seating was expected	◯	◯	◯	◯
Didn't listen when spoken to directly	◯	◯	◯	◯
Felt restless	◯	◯	◯	◯
Didn't follow through on instructions and failed to finish work	◯	◯	◯	◯
Had difficulty engaging in leisure activities or doing fun things quietly	◯	◯	◯	◯
Had difficulty organizing tasks and activities	◯	◯	◯	◯
Felt "on the go" or "driven by a motor"	◯	◯	◯	◯
Avoided, disliked, or was reluctant to engage in work that required sustained mental effort	◯	◯	◯	◯
Talked excessively	◯	◯	◯	◯
Lost things necessary for tasks or activities	◯	◯	◯	◯
Blurted out answers before questions were completed	◯	◯	◯	◯
Was easily distracted	◯	◯	◯	◯
Had difficulty awaiting turn	◯	◯	◯	◯
Was forgetful in daily activities	◯	◯	◯	◯
Interrupted or intruded on others	◯	◯	◯	◯

39. Instructions: Please select the response next to each item that best describes your behavior when you were a child ages 5 to 12. If you are taking medication to treat ADHD (such as Ritalin) or have taken it in the past six months please respond to these items based on your non-medicated behavior.

	Never or Rarely	Sometimes	Often	Very Often
Often acted without thinking (e.g., often started tasks without adequate preparation, such as reading or listening to instructions, jumped into activities, spoke out without considering consequences; made important decisions on the spur of the moment, such as buying items, quitting a job suddenly, or breaking up with a friend).	◯	◯	◯	◯
Often impatient (e.g., grabbed things instead of asking, wanted others to move faster, wanted people to get to the point, often speed while driving, cut into traffic to go faster than others).	◯	◯	◯	◯
Often rushed through activities or tasks, was fast paced (e.g., averse to doing things carefully and systematically).	◯	◯	◯	◯
Often had difficulty resisting immediate temptations or appealing opportunities, while disregarding negative consequences (in childhood, grabbed toys off store shelf, or fascinating dangerous objects or played with dangerous objects; in adulthood, commit to a relationships after brief acquaintance, take a job or enter into business arrangements without doing due diligence).	◯	◯	◯	◯

40. To what extent did the problems you may have just selected interfere with your ability to function in each of these areas of life activities *when your were a child between 5 and 12 years of age* ?

	Never or Rarely	Sometimes	Often	Very Often
In my home life with my immediate family	◯	◯	◯	◯
In my social interactions with others	◯	◯	◯	◯
In my activities or dealings in the community	◯	◯	◯	◯
In school	◯	◯	◯	◯
In sports, clubs, or other organizations	◯	◯	◯	◯
In learning to take care of myself	◯	◯	◯	◯
In my play, leisure, or recreational activities	◯	◯	◯	◯
In my handling of my daily chores or other responsibilities	◯	◯	◯	◯

Appendix E

Weiss Functional Impairment Rating Scale

WFIS

Please choose the answer that best describes your current status with regard to each of the following items.

28. Family

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Having problems with family	◯	◯	◯	◯	◯
Having problems with spouse/partner	◯	◯	◯	◯	◯
Relying on others to do things for you	◯	◯	◯	◯	◯
Causing fighting in the family	◯	◯	◯	◯	◯
Makes it hard for the family to have fun together	◯	◯	◯	◯	◯
Problems taking care of the family	◯	◯	◯	◯	◯
Problems balancing your needs against those of your family	◯	◯	◯	◯	◯
Problems losing control with family	◯	◯	◯	◯	◯

29. Work

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Problems performing required duties	◯	◯	◯	◯	◯
Problems with getting your work done efficiently	◯	◯	◯	◯	◯
Problems with your supervisor	◯	◯	◯	◯	◯
Problems keeping a job	◯	◯	◯	◯	◯
Getting fired from work	◯	◯	◯	◯	◯
Problems working in a team	◯	◯	◯	◯	◯
Problems with your attendance	◯	◯	◯	◯	◯
Problems with being late	◯	◯	◯	◯	◯
Problems taking on new tasks	◯	◯	◯	◯	◯
Problems working to your potential	◯	◯	◯	◯	◯
Poor performance evaluations	◯	◯	◯	◯	◯

30. School

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Problems taking notes	◯	◯	◯	◯	◯
Problems completing assignments	◯	◯	◯	◯	◯
Problems getting your work done efficiently	◯	◯	◯	◯	◯
Problems with teachers	◯	◯	◯	◯	◯
Problems with school administrators	◯	◯	◯	◯	◯
Problems meeting minimum requirements to stay in school	◯	◯	◯	◯	◯
Problems with attendance	◯	◯	◯	◯	◯
Problems with being late	◯	◯	◯	◯	◯
Problems taking on new tasks	◯	◯	◯	◯	◯
Problems working to your potential	◯	◯	◯	◯	◯
Problems with inconsistent grades	◯	◯	◯	◯	◯

31. Life Skills

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Excessive or inappropriate use of internet, video games or TV	◯	◯	◯	◯	◯
Problems keeping an acceptable appearance	◯	◯	◯	◯	◯
Problems getting ready to leave the house	◯	◯	◯	◯	◯
Problems getting to bed	◯	◯	◯	◯	◯
Problems with nutrition	◯	◯	◯	◯	◯
Problems with sex	◯	◯	◯	◯	◯
Problems with sleeping	◯	◯	◯	◯	◯
Getting hurt or injured	◯	◯	◯	◯	◯
Avoiding exercise	◯	◯	◯	◯	◯
Problems keeping regular appointments with doctor/dentist	◯	◯	◯	◯	◯
Problems keeping up with household chores	◯	◯	◯	◯	◯
Problems managing money	◯	◯	◯	◯	◯

32. Self-Concept

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Feeling bad about yourself	◯	◯	◯	◯	◯
Feeling frustrated with yourself	◯	◯	◯	◯	◯
Feeling discouraged	◯	◯	◯	◯	◯
Not feeling happy with your life	◯	◯	◯	◯	◯
Feeling incompetent	◯	◯	◯	◯	◯

33. Social

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Getting into arguments	◯	◯	◯	◯	◯
Trouble cooperating	◯	◯	◯	◯	◯
Trouble getting along with people	◯	◯	◯	◯	◯
Problems having fun with other people	◯	◯	◯	◯	◯
Problems participating in hobbies	◯	◯	◯	◯	◯
Problems making friends	◯	◯	◯	◯	◯
Problems keeping friends	◯	◯	◯	◯	◯
Saying inappropriate things	◯	◯	◯	◯	◯
Complaints from neighbors	◯	◯	◯	◯	◯

34. Risk

	Never or Not At All	Sometimes or Somewhat	Often or Much	Very Often or Very Much	N/A
Aggressive driving	◯	◯	◯	◯	◯
Doing other things while driving	◯	◯	◯	◯	◯
Road rage	◯	◯	◯	◯	◯
Breaking or damaging things	◯	◯	◯	◯	◯
Doing things that are illegal	◯	◯	◯	◯	◯
Being involved with the police	◯	◯	◯	◯	◯
Smoking cigarettes	◯	◯	◯	◯	◯
Smoking marijuana	◯	◯	◯	◯	◯
Drinking alcohol	◯	◯	◯	◯	◯
Taking "street" drugs	◯	◯	◯	◯	◯
Sex without protection (birth control, condom)	◯	◯	◯	◯	◯
Sexually inappropriate behavior	◯	◯	◯	◯	◯
Being physically aggressive	◯	◯	◯	◯	◯
Being verbally aggressive	◯	◯	◯	◯	◯

Appendix F

College Readiness Scale Key

1	SD: SK	I am aware of my talents, interests and my dreams for the future.
2	SD:SK	I am aware of my feelings and reactions when I have to get used to new people, places and situations, and what helps me adjust.
3	SD:SK	I am aware of my strengths and weaknesses in my academic and learning skills.
4	SD: SA/CS	I introduce myself to new people and hold conversations with others.
5	SD: SA/CS	I express my strengths and weaknesses to my teachers or other people.
6	SD: SA/CS	I admit when I don't understand something in class and comfortably ask for help.
7	SD: SA/CS	I find the help or support I need when I have a problem.
8	SD: SA/CS	I express my thoughts well, even when I have a different view or opinion, and stand firm when needed.
9	SD: SA/CS	I talk with other people involved in any conflict and problem-solve to handle the situation.
10	SD: SM	I listen and understand what my friends and family members are saying about me without getting defensive.
11	SD: SM	I regularly set realistic goals for myself in all areas of my life.
12	SD: SM	I develop plans to reach my goals and put them in to action.
13	SD: SM	I periodically think about my progress in reaching my goals and make modifications as needed.
14	SD: SM	I persistently deal with any challenge without becoming frustrated until I find an acceptable solution.
15	SD: SM	I observe my emotions and deal with them productively.
16	DLS:SC	I wash and care for my own clothes.
17	DLS:SC	I take any medications I need with few or no reminders.
18	DLS:SC	I make my own doctor appointments and call to refill my prescription medications.
19	DLS:SC	I prepare meals or choose healthy foods for my daily meals.
20	DLS:SC	I get adequate exercise to remain healthy.
22	DLS:SC	I manage money well and can be trusted with credit cards.
23	DLS:SC	I make good decisions about how to handle stress.
24	DLS: O	I organize my room and possessions with few or no reminders.
25	DLS: O	I keep track of my important possessions and find them when I need them.
26	DLS:TM	I awaken myself each day and get out the door each day without much help from others.
27	DLS:TM	I send myself to bed each night at a reasonable time.

28	DLS:TM	I make good decisions about how to balance fun, chores, and school work.
29	DLS:TM	I get places on time with no problem.
30	AS:SK	I know my learning style and can find ways to help me learn and study best in different classes.
31	AS:SK	I know when and where I need to study to get the best results.
32	AS:SK	I know how to motivate myself to face difficult assignments.
33	AS:SS	I take notes from my reading assignments.
34	AS:SS	I take complete notes in class that are useful to me when I study for exams.
35	AS:SS	I identify what is important when I am reading.
36	AS:SS	I organize my ideas and write and edit my own papers.
37	AS:SS	I prepare for tests and final exams.
38	AS:SS	I review my class notes, assigned readings, and other materials on a regular basis.
39	AS:SS	I use the help available in school when I don't understand something or want to improve how I study.
40	AS:TM	I set up my own study schedule.
41	AS:TM	I consistently complete daily assigned homework.
42	AS:TM	I have developed and use a system for keeping track of due dates for all my assignments.
43	AS:TM	I stay on top of my reading assignments.
44	AS:TM	I write assigned papers, study for tests, and complete long-term projects in a timely manner.

Note. SD = self-determination, SK= self-knowledge, SA/CS= self-advocacy/communication skills, SM= self-management, DLS: daily living skill, SC= self-care O= organization, TM= time management, and AS = academic skills.

Appendix G

Consent Form

Review of Consent Form

The following information is provided as a reminder of what you have already provided consent for:

Purpose of Research. Previous studies have suggested that the symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) vary across the lifespan, but little research evidence exists regarding how ADHD manifests in emerging adults (such as college students). This study seeks to extend the current research base by examining a new set of diagnostic criteria in the college student population at Appalachian State University, among other universities, with the aim of establishing ADHD criteria that are age appropriate for this age group. Specifically, you will be asked to complete questions regarding personal history (such as ethnicity, age, family structure, education, grades, history of psychological diagnosis and/or treatment), current (past 6 months) and past (ages 5 to 12) behaviors that have been shown to be related to ADHD (including some "oppositional" and "delinquent" behaviors and your current mood and stress level), and how much these behaviors may have affected your adjustment in your life. You will also be asked to answer questions related to your mood and perceptions of your mother's parenting style while growing up at home. You will also be asked to rate your comfort level in personal relationships and your mastery of communication skills, reaching goals, organization, time management, and academic skills. The researchers also are examining whether ADHD symptoms and impairment differ between men and women, and also how the impressions of significant others (such as parents, romantic partners) correspond to college students' behavioral reports. Please note that we will be asking you to provide us with contact information of a parent and a "significant other" (if available) in order for us to collect the appropriate data. Collateral informants of all individuals indicating a prior diagnosis or clinically elevated (> 93rd percentile, approximately 200 sought) symptoms of ADHD will be contacted for participation. The collateral contacts of only about one in five individuals without such ADHD traits (again, approximately 200 total) will be contacted, based on characteristics (age and gender) matching those of ADHD-positive participants. Participation and answers given in this study, by students or their collateral informants, should not be considered as "diagnostic." Clinical diagnoses of ADHD and/or other disorders can only be made in more comprehensive, in-person assessments by qualified mental health or medical professionals.

Duration of Participation. Participation will take approximately one hour, and you will complete the study online. No follow-up procedures are planned.

Risks to the Individual. There are minimal foreseeable risks, either physical or psychological, associated with your participation in this study. The surveys you will complete relate to the constructs noted above, and include questions about your behaviors (including mental health history and some illegal activities in childhood and adolescence, like aggression toward others, truancy, and property destruction) and current and past adjustment in school, at home, and in other situations. At any time, you may choose to skip questions that you think are stressful; this will not affect reimbursement or course credit received for experiment completion. The data collection for this study is conducted online, and no method of transmission over the Internet, or method of electronic storage, is perfectly secure. Therefore, we cannot guarantee absolute security. However, we anticipate that the information being requested will put you at no greater risk than you would typically encounter during a routine psychological examination.

Benefits to the Individual or Others. While there is no direct benefit to you for participating in this study, the information derived from this project may have important societal benefits. Specifically, the information gained may contribute to more accurate assessments of attention and hyperactivity/impulsivity problems in adults.

Voluntary Nature of Participation. Your participation is completely voluntary, and you may discontinue participation at any time without the loss of any benefits which would otherwise be provided to you. Declining to participate or to answer any specific question will have no adverse effect on any of your grades.

Confidentiality. All information relating to your performance during this study will be kept confidential. The online surveys are managed at the SurveyMonkey site in a secure, password-protected account that is accessible only by Dr. Canu and members of his research team. Your identifying information (such as name, email address) will be collected on this separate online form and will be used to facilitate payment or crediting. After you have completed this consent survey-- which registers your identifying information in its own database—you will be contacted via email within the next few days containing a hyperlink to the main study survey that contains the remainder of the questions. As such, your name will not be directly linked to your experimental survey responses. Your answers to survey questions will only be used by Dr. Canu or his laboratory team or colleagues for research purposes once the database is converted so that all data will be associated only with participant codes (instead of names or other identifying information). Your responses to survey questions will not be disclosed to your parent or significant other, should they participate, and you will similarly not have access to their responses. Confidentiality of all responses will be maintained to the degree permitted by the technology used (technically, no guarantees can be made regarding the interception of data sent via the Internet by any third parties). Your name will never be used in any publication or presentation of results. In fact, after data collection and credit distribution has been completed, your name and other identifying information will be deleted entirely from the database. In fact, after data collection and credit distribution has been completed, your name and other identifying information will be deleted entirely from the database, unless you specifically permit us to keep such information in order to contact you in the future regarding other possible research opportunities.

Appendix H

Notice of IRB Exemption

From: Dr. Lisa Curtin, Institutional Review Board Chairperson
Date: 6/24/2015
RE: Notice of IRB Exemption
Study #: 15-0304

Study Title: College readiness: Differences between students with and without ADHD

Exemption Category: (4) Collection or Study of Existing Data, If Public or Unable to Identify Subjects
This study involves minimal risk and meets the exemption category cited above. In accordance with 45 CFR 46.101(b) and University policy and procedures, the research activities described in the study materials are exempt from further IRB review.

Study Change: Proposed changes to the study require further IRB review when the change involves:

- an external funding source,
- the potential for a conflict of interest,
- a change in location of the research (i.e., country, school system, off site location),
- the contact information for the Principal Investigator,
- the addition of non-Appalachian State University faculty, staff, or students to the research team, or
- the basis for the determination of exemption. Standard Operating Procedure #9 cites examples of changes which affect the basis of the determination of exemption on page 3.

Investigator Responsibilities: All individuals engaged in research with human participants are responsible for compliance with University policies and procedures, and IRB determinations. The Principal Investigator (PI), or Faculty Advisor if the PI is a student, is ultimately responsible for ensuring the protection of research participants; conducting sound ethical research that complies with federal regulations, University policy and procedures; and maintaining study records. The PI should review the IRB's list of PI responsibilities.

To Close the Study: When research procedures with human participants are completed, please send the Request for Closure of IRB Review form to irb@appstate.edu.

If you have any questions, please contact the Research Protections Office at (828) 262-2692 (Robin).

Vita

Loren McCraw Ranson was born in Kansas City, Kansas. She graduated from Chattahoochee High School in Alpharetta, Georgia, in May 2010. The following fall, she entered Georgia College and State University, and in May 2014, she was awarded the Bachelor of Science degree in Psychology. In the fall of 2014, she attended Appalachian State University in Boone, North Carolina and began working toward a Master of Arts degree in Clinical Psychology. During her time at Appalachian State University, she completed practicums at the ASU Psychology Clinic and the ASU Counseling and Psychological Services Center. She participated in the Adult ADHD Laboratory and the Anxiety and Exercise Laboratory. She also completed an internship at the ADHD Clinic at the University of North Carolina at Greensboro.